**PATENT**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

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| Application No.: | 10/579,654 |
| Filing Date: | May 18, 2006 |
| Applicant: | Paul Meredith, et al. |
| Group Art Unit: | 1792 |
| Confirmation No.: | 9357 |
| Examiner: | Alexander M. Weddle |
| Title: | Silica Films and Method of Production Thereof |
| Attorney Docket: | 6106-000006/US/NP |

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Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

**DECLARATION UNDER 37 C.F.R. § 1.132**

I, Dr. Michael Harvey, hereby declare as follows.

1. I hold an Bachelor's degree in Physics from the University of Queensland, Australia; an Honours degree in Physics from the University of Queensland; and a Ph.D. in Physics and Optical Materials from the University of Queensland.
2. From 2007, I have been an Honorary Research Fellow at the University of Queensland.
3. I am the founder and Chief Technology Officer of XeroCoat, a solar coatings company based in Redwood City, California with research & development facilities in Brisbane, Australia.
4. I have authored a number of peer reviewed papers and addressed many international conferences on optical thin films and materials physics. I am also a named inventor or co-inventor on 6 patents including the above-identified application, Application No.10/579,654 (Meredith '654).
5. I have reviewed and am familiar with the Silica Films and Method of Production described in Meredith '654.

6. I have also reviewed US Patent No. 5,698,266 to Floch *et al.* entitled *Process For The Production Of Thin Coatings Having Optical And Abrasion Resistance Properties* ("Floch '266") and US Patent No. 6,316,572 to Nambu *et al.* entitled *Curable Composition For Coatings, Coated Articles And Resin Composition For Coatings* ("Nambu '572").

7. The process of Floch '266 is a sol-gel process, whereas the process described in Meredith '654 is a phase-separation templating process. The process of Meredith '654 allows for morphology control over film pore size which could not have been predicted or even inferred from the process of Floch '266.

8. In support of these statements, I have reviewed data from a test process in which a silicic acid tetramethyl ester homopolymer solution was deposited on a glass substrate via dip coating, as described in Meredith '654. The coated article was then allowed to dry in the manner described in Floch '266 (col. 6 lines 55-56). Subsequently the transmittance of the coated article was measured to be ~90% at 1000nm (c.f. Floch T=95.4% at 1000nm col. 6 line 60), and the refractive index of the coating was determined to be 1.39 (c.f. Floch n=1.22 col. 6 line 61-62). For reference, a refractive index of ~ 1.4 would suggest a dense silica layer and therefore not porous.

9. This data shows that there is no layer of particles formed when an alcohol/MS-51 solution is used according to the process described in Floch '266. The absence of a layer of particles results from the fact that the silica precursor solution of the process described in Meredith '654 is not a colloid as the Floch process requires.

10. The process taught in Floch '266 requiring a colloid ensures that all hydrolysis of the silica source is complete before deposition and that the porosity in the final film is present at the time of drying due to the random packing of silica particles.

11. Floch '266 observes that, post deposition, changes in the coating thickness do not have any effect on the film porosity or refractive index (col.5 lines 36-38). Floch '266 goes on to point out that this condition is only consistent with one possible interpretation: the coated layer is formed of silica colloid particles whose surfaces are hydroxylated. The alkaline treatment of Floch '266 thus condenses the surface silanols binding the particles together (col.5 lines 43-54).

12. The process described in Meredith '654, by contrast, does not produce any solids until exposure to the curing environment and relies on those alkaline conditions to induce a phase separation which will assemble and template the film's final porosity. This can be controlled because of the self-limiting nucleation, growth and chemical sintering of the particles from the continuous phase.

13. Even if MS-51 from the process of Nambu '572 were to be substituted into the process of Floch '266, the present process, as defined by claims 35 and 62 of Meredith '564, would still not be taken since the process of Floch '266 would result in early hydrolysis to form a colloid prior to deposition on the substrate whereas the claimed process requires that the silica source be maintained as a solution in the solvent until exposure to an ammoniacal environment after deposition on the substrate.

14. I further declare under penalty of perjury under the laws of the United States of America that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements may jeopardize the validity and enforceability of any rights in this application or any patent issuing thereon.

Dr. Michael Harvey

25 August 2010
Date

DAM:pal